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The Great Auk (*Pinguinus impennis*) in the Netherlands during the Roman Period

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ABSTRACT Bones of the great auk (*Pinguinus impennis*) have been found in four archaeological sites in the Netherlands in recent years. These sites all date to the early Roman period. The great auk is believed never to have been a breeding bird in the Netherlands, which makes the presence of the bones remarkable. The history and ecology of the great auk are outlined. Some possible reasons are discussed for the presence of the great auk in Dutch waters during the early Roman period. Copyright © 2004 John Wiley & Sons, Ltd.

Key words: great auk; *Pinguinus impennis*; Netherlands; Roman period; ecology

Introduction

In recent years, several bones from different Roman archaeological sites in the Netherlands have been identified as great auk bones. Added to the find of a nearly complete skeleton from Velsen in 1977 (Van Wijngaarden-Bakker, 1978), the total number of Roman sites in the Netherlands with great auk bones is now four. This contrasts with the absence of great auk bones at sites dating to other periods. Because of the auk's rarity in historic times, the absence of finds in post-medieval excavations is not remarkable, but if the great auk was a regular visitor to Dutch coastal waters, we would expect to find it in prehistoric sites and medieval sites as well as in Roman sites. In prehistoric contexts in Scandinavia, for instance, great auk bones are quite common (Greenway, 1967).

The great auk: a history of extinction

It is a sad fact of natural history that extinct birds seem to attract more interest than living birds. The great auk is no exception. Since it became extinct in 1844, scores of naturalists and non-naturalists alike have devoted their time to this bird.

The great auk was a member of the auk family (Alcidae), living and breeding in sub-arctic seas on both sides of the Atlantic Ocean. When seafaring to North America took off in the 16th century, sailors soon discovered that the large breeding colonies of great auks off Newfoundland formed a ready supply of fresh meat. Cod fishermen and poor colonists based in Newfoundland exploited the breeding colony of great auks on Funk Island ruthlessly for food. During the 18th century, the birds were killed for their feathers which were made into pillows and bedding (Gaskell, 2000).

Although in Europe the great auk had not been as abundant in historical times as it was in North America, it lingered on for longer. In the early 19th century, naturalists began to realise the

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increasing scarcity of the bird. This resulted not in conservation, as it would today, but in a rush to obtain specimens for natural history collections. Prices soared until finally no more birds could be found. The last record is of a pair of great auks killed in 1844, just as they had started incubating on Eldey Rock, Iceland (Greenway, 1967).

Archaeological finds of great auk bones from the Netherlands

Although one Pleistocene find from the Netherlands is known (Kompanje & Kerkhoff, 1991), all the finds from archaeological contexts date from the Roman period (Figure 1).

In 1977, a nearly complete skeleton of a great auk was retrieved from a ditch during excavations of the Roman fort of Velsen. The skeleton dates to the first century AD (Van Wijngaarden-Bakker, 1978). Two great auk bones were identified among the animal bones from a settlement at Scheveningseweg, The Hague. The two bones are fragments of a mandibula and a sternum. They were identified as great auk bones by comparison with the skeleton from Velsen



Figure 1. Sites with great auk bones in the Netherlands: (1) Velsen; (2) The Hague; (3) Schipluiden; (4) Vlaardingen. (Image: I. Vossen).

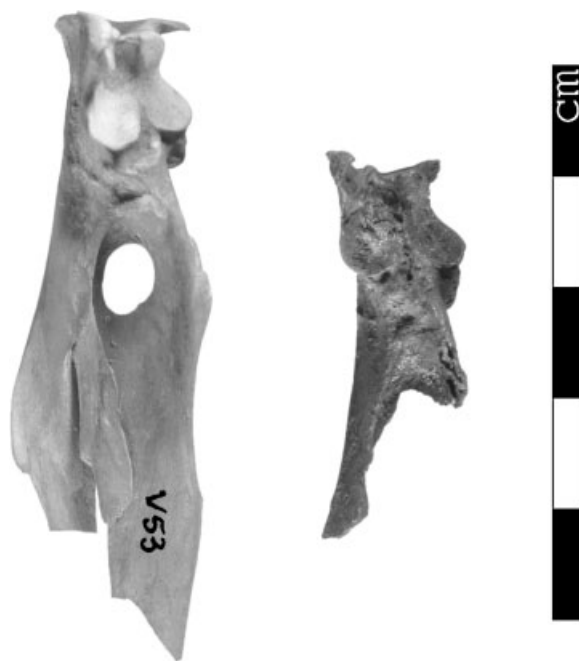


Figure 2. Fragment of great auk mandible from The Hague (right) compared with mandible from the great auk skeleton from Velsen. (Photo: A. Dekker).

(Figures 2 and 3). The site in which the bones were found dates to between 100 and 250 AD, but the great auk bones can be dated to between 190 and 250 AD (Frits Laarman, personal communication). Part of a great auk synsacrum was found in a creek in Vlaardingen (Hoogstad site 6.036) (Figure 4). This fragment was also identified by comparison with the skeleton from Velsen, and can be dated to between 100 and 150 AD (Van Dijk *et al.*, 2003). In Schipluiden (Midden-Delfland site 21.23), an ulna was identified as belonging to a great auk (Groot, 1998) (Figures 5 and 6). As both ulnae are missing in the skeleton from Velsen, this bone was identified as great auk by Cohen & Serjeantson (1996). The site in which it was found can be dated to the first century AD. It is with some reservation that the ulna is dated to the Roman period, as there exists confusion as to the precise find spot, and thus the exact date. The deviating colour of the bone (it is the only white bone from the excavation) is also suspicious. Radiocarbon dating will hopefully solve this problem. In this article, the bone will be discussed as dating to the first century AD, although with some reservation.



Figure 3. Fragment of great auk sternum from The Hague (below) compared with sternum from the great auk skeleton from Velsen. (Photo: A. Dekker).



Figure 4. Fragment of great auk synsacrum from Vlaardingen. (Photo: Archeoplan).

Ecology of the great auk

Although man played a large role in the great auk's extinction, the bird was pre-eminently prone to becoming extinct. Firstly, its reproduction was slow. Being long-lived birds, they prob-

ably did not start breeding until 4–7 years old (Bengtson, 1984), and even then they only laid a single egg each year (Grieve, 1885). Secondly, the great auk's inability to fly put restraints on their breeding colonies: they were dependent on rocky off-shore islands with sloping access to the



Figure 5. Great auk ulna from Schipluiden.

sea. Unlike the cliffs other auks breed on, these islands were also easily accessible to humans. Their inability to fly made the birds very vulnerable when they were at the breeding colonies. Furthermore, because of the trusting nature typical of many island animals, the birds were all too easily caught (Quammen, 1996). Finally, although the species has been called abundant (Grieve, 1885), a more recent study suggests that the great auk was never an abundant species (Birkhead, 1993). The restricted number of suitable breeding places would have prevented the great auk from ever having been abundant. The fact that the entire number of great auks consisted of only a handful of populations made it vulnerable to natural disasters (Quammen, 1996). In 1830, the island Geirfuglasker, a great auk breeding colony off Iceland, disappeared as a



Figure 6. Great auk ulna from Schipluiden.

result of volcanic activity. Although the great auks found a new island to breed on, this was much closer to the mainland and thus put them at greater risk from human predation (Grieve, 1885).

The large size of the great auk enabled it to reach greater depths when fishing than other auks. Its inability to fly did not put restraints upon its size, as happens in flying birds. However, the agility and speed needed for fishing limited the bird in becoming even larger. The great auk developed as a specialised fisher of deep waters. The shortened and flattened bones of the wings were an adaptation to underwater flight (Gaskell, 2000).

It seems likely that the great auk would have restricted its time ashore as much as possible. Apart from putting the bird in a vulnerable position, its flightlessness limited the area in which it could forage. Unlike other auks, who sometimes fly great distances to find food for themselves and their young, the great auk could

never have ranged far from the breeding colony (Birkhead, 1993). This fact contributes to the theory that the great auk's chick was semi-precocial. This theory is supported by a number of other facts. Firstly, despite frequent references to the great auk in historical writings, hardly any mention is made of juvenile birds at the breeding colonies. Secondly, the breeding season seems to have been very short (Martin, in Birkhead, 1993). Most of this time would have been spent in incubating the large egg.

Finally, a number of other auk species (guillemot, razorbill and several species of murrelet) also have semi-precocial chicks (Gaskell, 2000). There are two 17th century writers who mention the great auk carrying its chick on its back (Gaskell, 2000). This would have prevented the chick from cooling down too much during its first days at sea.

Although we know that breeding adults spent the breeding season ashore and the rest of the year at sea, non-breeding birds would have spent the whole year out at sea. Juvenile birds would not have returned to their place of birth until they were ready to start breeding, when they were at least a few years old.

Range of the great auk in Europe

Greenway (1967) listed a number of known and probable breeding sites. For Europe, this includes Iceland, the Faroe Islands, St. Kilda, the Outer Hebrides, Papa Westra, the Orkney Islands, and less likely, Lundy Island and the Isle of Man. Historical records mention the great auk occurring on the Farne Islands (off the east coast of Northumbria). We must bear in mind that most of the descriptions we have of great auks date from a time in which it had become a rare species. However, the fossil and archaeological finds confirm and complement the literary sources.

A recent article described archaeological finds of great auks from Britain (Serjeantson, 2001). Most finds originated from the islands west of Scotland and from the Orkneys, but a 17th century bone was found on the Isle of Man, and several bones were found in a site from the third century AD on the Isles of Scilly. Greenway

(1967) mentioned an archaeological find of uncertain date from County Durham.

Outside Britain, great auk bones have been found in Norway, Sweden, Denmark, Ireland, the Channel Islands, France and southern Spain (Greenway, 1967).

The great auk in the Netherlands

Although many questions remain about the ecology and behaviour of the great auk, of one thing we can be certain: it never bred in the Netherlands. Nowhere in the Netherlands do we find an island suitable for the great auk's breeding requirements.

If it did not reach the Netherlands in search of a breeding place, it may have strayed into Dutch waters in winter. Like most species of alcids, great auks were pelagic birds when not breeding, spending their winters wandering at sea. However, no auk in good health would voluntarily come ashore during this time. The Dutch great auks may represent weakened, ill or dead individuals washed ashore. Although this explains the birds' presence in the Netherlands, it does not explain why the great auks are only found there in the Roman period, or even more precisely, in the first two centuries AD.

Discussion

Greenway (1967) explained the presence of two great auk bones in Florida as an accidental visit of a bird which was forced south by northerly gales. This may explain a solitary find, but the number of finds from the Roman period in the Netherlands is too high (five finds in four different sites, with different dates) for such an explanation to be likely.

We can come up with a number of possible explanations. These explanations can be divided into three sections. In the first section, we must discuss whether human activity could explain the great auk finds in the Netherlands.

Firstly, it is possible that the birds were not more common in the early Roman period than in other times, but that they were caught more often by human hunters. However, considering the

great auk's speed and agility at sea, it seems unlikely that humans would succeed in catching a bird so much at home in its natural surroundings. Catching seabirds is only a rewarding pursuit during the breeding time, when a high number of birds is concentrated in a small area, and when the birds are reluctant to leave their eggs or young. Furthermore, hunting played a minor role in the Roman period. In all excavations of sites dating to this period, the percentage of wild birds and mammals is very low (see, for instance, Lauwerier, 1988; Zeiler, 2001; Van Dijk *et al.*, 2003).

A second explanation is that the great auks were not caught in Dutch waters at all, but brought here from their normal breeding range. Theoretically, soldiers in the Roman army could have obtained a great auk in the north of Britain (the only possible breeding place in the Roman Empire) and brought it to the Netherlands when they retired from active service. We know that Batavian auxiliaries were present on and off in Britannia from 43 AD onwards. From 43 to 66 AD, Batavian cohorts took part in the conquest of Britannia (Birley, 2002). By 83 AD, they were back to play their role in the Battle of Mons Graupius (Birley, 2002). Although the exact location of the battle is unknown, it is certainly north of the Firth of Forth (Breeze, 1996). From about 92 to 103 AD, one or two Batavian cohorts were stationed in Vindolanda (Bowman, 1994). Further evidence for the presence of Batavian soldiers in Britain dating to the first half of the second century AD is found in several places along Hadrian's Wall (White, 2003).

Although it is possible that veteran Batavian auxiliaries returning to their homeland brought back a great auk, this seems highly unlikely. The breeding sites of great auks in Scotland were all on the western and northern islands (Serjeantson, 2001). The activities of the Roman army, on the other hand, were concentrated on the mainland (Breeze, 1996). Apart from the fact that the birds had no commercial value, it is not very likely that a great auk would have survived such a long journey. We can extend the same arguments against the possibility that trading would have resulted in great auks being transported to the Netherlands, either from the north of Britain or from Scandinavia. Although trading routes

existed, it is highly unlikely that traders would have gone to the trouble of first catching or purchasing a great auk, and then transporting it to the Netherlands.

If man cannot be held responsible for the great auk finds in the Netherlands, we must look at nature. Nature can affect the distribution of birds in different ways.

Firstly, a population of birds can be affected by a change in climate. Even a small change in temperature can affect the distribution of a species of bird. Although it is beyond doubt that it was man who drove the great auk to extinction, it seems that climatological changes caused the species to decline well before European seafarers started their systematic slaughter of the great auk (Bengtson, 1984). The specific ecological requirements of the great auk made it more vulnerable to climatic change than other alcids. The Little Ice Age started in the 13th century and resulted in colder summers. Apart from influencing the abundance and distribution of prey species (Bengtson, 1984), a fall in summer temperature would have resulted in heavier sea-ice which could have prevented the great auks from reaching their breeding colonies (Birkhead, 1993). During the first four centuries of the first millennium, some cold winters occurred (Lamb, 1982). These may have caused great auks to travel further south during winter than they would normally do. Alternatively, a change in climate may have affected the distribution of their prey, causing great auks to follow shoals of fish outside the limits of their normal range. This could explain the presence of the birds along the Dutch coast. However, if a few cold winters were enough to force great auks into Dutch waters, the absence of great auks later in the first millennium, when the weather was even more unstable, must be explained (Lamb, 1982). This absence will be discussed in the third section.

A second explanation could be a change in sea currents. This would especially affect non-flying birds who would have taken advantage of prevailing currents. Many auks use sea currents when migrating, especially during the annual moult when they are unable to fly (Birkhead, 1993). The flightless great auk may have been more dependent on currents than other species of auk, using currents not only when moulting but

throughout the year. However, at the moment there are no indications that sea currents were different during the first centuries of the first millennium. Unfortunately, there are simply no data on this subject.

In the third and final section, we will discuss chance, a factor that archaeologists are forced to consider. When we accept that climate was responsible for the great auk finds in the Netherlands in the Roman period, it seems strange that there are no finds from the second half of the first millennium. Lamb (1982) mentions a 'generally rather colder and more disturbed climate later in the millennium, particularly in the sixth century and at certain times between about AD 750 and 900'. Many storms and sea floods around the North Sea can be dated to this period (Lamb, 1982). Surely we would then expect even more great auks to be stranded on Dutch beaches during this period than during the Roman period. Their absence can be explained, not by rejecting the climate hypothesis, but by accepting chance as an important factor in the great auk finds from the Roman period. Many settlements have been recorded and excavated near the North Sea Coast for the Roman period, but the data are much more limited for the early Middle Ages. When a search is done in BoneInfo, a zooarchaeological database developed by the Archaeological State Service, 127 faunal samples are found for the Roman period, and only 29 for the early Middle Ages. Of these 29, only 11 date to the period 500–900 AD. It could well be that great auks did indeed end up on Dutch beaches during this period, and perhaps even in early medieval settlements, but that they have simply not been found.

Therefore, we must add the role of chance to our climate hypothesis. A change in climate caused the great auks to strand on Dutch beaches, but fate ensured that only the Roman ones have been found in excavations.

Conclusion

It seems beyond doubt that the great auk bones found in four archaeological sites in the early Roman period in the Netherlands are from winter visitors, weakened and washed ashore.

A combination of circumstances resulted in the following scenario. Some cold winters resulted in great auks drifting further to the south than they normally would, either following their prey or avoiding the cold. Some birds must have become weakened or died, and were washed ashore. These birds were found and taken away by people, either as food (if the bird was still alive) or out of curiosity. People living near the coast must have taken advantage of the coastal resources, such as material left on the beach after a heavy storm. This may seem a far-fetched scenario, but it is more likely than the alternative: transport of living great auks by soldiers or traders, either from Britain or Scandinavia.

At the moment, we have only a handful of cases and can only speculate on their origin. Hopefully, new excavations of settlements near the Dutch coast will unearth new finds of great auk bones, perhaps from the early Middle Ages, enabling us to complete the story of the great auk in the Netherlands.

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